



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,460	12/26/2001	John R. Karpinsky	2119-0171P	4198

7590

07/21/2003

Patent Administrator  
Mems Optical, Inc.  
205 Import Circle, Suite 2  
Huntsville, AL 35806

EXAMINER

ROJAS, OMAR R

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 07/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Applicati n N .

10/025,460

Applicant(s)

KARPINSKY ET AL.

Examiner

Omar Rojas

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-11 is/are allowed.
- 6) ☒ Claim(s) 1-6, 12, and 14-19 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 9 recites the limitation "the actuator assembly." There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 1-4, 6, 12, 14-15, and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Ming C. Wu ("Wu") in the paper titled "Micromachining for Optical and Optoelectronic Systems" published in the Proceedings Of The IEEE, Volume 85, No. 11, November 1997.**

Regarding claims 1-2, 12, 17, and 18, Wu discloses an optical micro-switch in Figs. 30-31 comprising: a generally planar substrate; a first optical input/output fiber; a plurality of second optical input/output ports; and an optical guiding assembly comprising an optical micro-mirror and an actuator assembly. The optical micro-switch of Wu is also substantially configured in the same manner as recited by claims 1-2 and 18. Id. at pp. 1846-48.

Regarding claims 3, 14, and 19, Wu describes electrostatic comb drive actuators which would inherently be used in the optical switch of his Fig. 31. Id. at pg. 1841.

Regarding claims 4 and 15, Wu also teaches the use of etched microlenses that "can be integrated with [linear] translation and rotation stages." Id. at 1841.

Regarding claim 6, Wu also shows in Fig. 41, an optical micro-switch comprising: a generally planar substrate; a first optical input/output fiber; at least three second optical input/output ports; and an optical guiding assembly comprising an optical microelement/micromachined translation stage coupled to and an electromagnetic actuator, and wherein said micromachined translation element moves to at least three plural positions corresponding to the number of second optical input/output ports. Id. at pg. 1853.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**9. Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu.**

Regarding claims 5 and 16, the examiner incorporates herein the previous remarks under the 102 section concerning claims 1-2, 12, 17, and 18.

Thus, Wu only expressly differs from claims 5 and 16 in that Wu does not expressly recite using a glass ball lens.

However, glass ball lenses are well-known in the art. Substituting the microlenses expressly taught by Wu with ball lenses would merely be a substitution of equivalent, well-known, structures.

Therefore, it would have been obvious to one of ordinary skill at the time of the claimed invention to obtain the invention specified by claims 5 and 16 through routine substitution of equivalent parts.

***Allowable Subject Matter***

10. Claims 7-11 are allowed.

Art Unit: 2874

11. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 7-11, the prior art does not suggest, alone or in combination, an optical micro-switch comprising all the recited features, in particular, a horizontal electrostatic comb drive moving an optical micro-element to plural positions greater than two (i.e., 3 or more) and corresponding in number to a plurality of second optical input/output ports to direct an optical signal between the first optical port and a selected one of said second optical input/output ports.

Regarding claim 13, the prior art does not suggest, alone or in combination, a method for switching an optical signal between a first optical input/output port and at least one of a plurality of second optical input/output ports, the method comprising all the recited steps, in particular: providing said first and second optical input/output ports in an arrangement generally parallel to a generally planar substrate; providing an micro-optical element between said first optical input/output port and said plurality of second optical input/output ports; and directing the optical signal between the first optical input/output port and a selected one of the plurality of second optical input/output ports by shifting transversely said micro-optical element to plural positions corresponding in number to the number of said plural second optical input/output ports.

**Conclusion**

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 6,549,703 to Tanielian and U.S. Patent 5,923,798 to Aksyuk et al. disclose similar prior art optical switches. U.S. Patent Application Publication 2002/0105699 to Miracky et al. discloses the use of a micro-lens to switch optical signals from a first input/output port.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Omar Rojas whose telephone number is (703) 305-8528 and whose e-mail address is [omar.rojas@uspto.gov](mailto:omar.rojas@uspto.gov). The examiner can normally be reached on Monday-Friday (7:00AM-3:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hemang Sanghavi, can be reached on (703) 305-3484. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722 for regular communications. The examiner's personal work fax number is (703) 746-4751.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Omar Rojas  
Patent Examiner  
Art Unit 2874

or  
July 12, 2003

  
HEMANG SANGHAVI  
PRIMARY EXAMINER